



SAFETY GUARDRAILS

DESCRIPTION

Pro-Bel safety guardrails, designed to resist accidental falls, are steel pipe railings consisting of a top rail, midrail and posts. All pipe rails are nominal 1-5/8" (41 mm) outside diameter with posts spaced not more than 8'-0" (2440 mm) on center. Rail height is 42" (1069 mm) standard OSHA guardrail height.

Rail sections are progressively slipped together using internal connector sleeves 1" (25 mm) outside diameter which are pre-welded to the post fittings. The spliced joints are then caulked to match the color of the rail to produce a flush looking guardrail with smooth, contemporary lines.

Finishes: Available with Pro-Bel standard powder coated or baked enamel finish in a wide range of stock colors (or custom color) or exposed hot dipped galvanized finish, or with grey primer only for site painting.

Mounting Options: Pro-Bel safety guardrails may be parapet wall mounted, roof mounted on steel piers, or mounted to any steel fabrication such as a metal catwalk. Guardrails can also be com-

bined with Pro-Bel safety anchors used in connection with suspended building maintenance if desired.

USE

For roof areas where workers are performing tasks within 6'-0" (1830 mm) of the roof edge without the benefit of a minimum 42" (1069 mm) high parapet, e.g. when window cleaners are setting up primary suspension equipment and safety lines, inspection of roofing or mechanical equipment, servicing video cameras, lighting or similar rooftop activities.

Example areas of use for Pro-Bel railings include:

- Roof edges e.g. narrow roofs
- At man door openings
- Protection of open sided floors, platforms and runways.
- Around mechanical equipment
- Industrial applications to provide protection from the hazards of open pits, tanks, vats, ditches, waterside edges, and similar uses.
- New construction or retrofit

* The intent of OSHA is to provide safety guardrails at narrow roof areas (a non-restrictive fall protection system). Options include providing continuous guardrails at roof perimeter and/or localized guardrails at hazardous locations.

STANDARDS CONFORMANCE

Pro-Bel safety railings conform to:

- OSHA 1910.22 (Walking-Working Surfaces).
- 1910.66, Subpart F (Powered Platforms).
- OSHA 1926.501, Subpart M (Safety and Health Standards for Construction).
- California State Regulations, Title 8 - Industrial Relations, Article 2, Section 3209 (Standard Guardrails).
- ANSI/AWS D1.2/D1.2M:2003 Structural Welding Code-Steel.

FEATURES

- Designed to OSHA regulations.
- Smooth surfaced fabrication, to prevent injuring workers.
- Rail ends do not overhang posts except where such overhang does not constitute a projection hazard.
- Easy to assemble and install without any site welding.
- Pre-engineered to ensure structural integrity. Railings are anchored or mounted to withstand at least a load of 200 lbf (0.9 kN) applied in any direction at any point on the top rail.
- Corrosion resistant and virtually maintenance free.



Pro-Bel safety guardrail secured to metal catwalk enclosing narrow roof.



Safety guardrail at davit base anchorage which is used for suspended maintenance. Low parapet requires 42" (1067 mm) high guardrail if workers are approaching within 6'-0" (1830 mm) of roof edge. This installation is located in a narrow roof area.

MATERIALS/FABRICATION
(as applicable)

Rails, Posts and Fittings: Mild steel tube sections to ASTM A53, 1-5/8" (41 mm) outside diameter, 1/8" (3 mm) wall thickness, finished as desired. Rails are interconnected using internal connectors and prefabricated elbow fittings having flush radius bends. All closely fitted joint connections are sealed using manufacturer's standard caulking, color to suit finished rail.

Wall Mounting Plates: Galvanized mild steel as above 1/4" (6 mm) thickness, finished to match railing, and designed to receive various securements including epoxy adhesive bolts, cast-in-place, bolt through and weldment. Plates are available in straight or angled configurations.

Roof Mounting Piers: Galvanized mild steel HSS, Type 350W with yield strength of 50 Ksi (350 MPa), hot-dip galvanized to ASTM A123/A 123M-2000, supplied complete with spun aluminum flashing (6061-T6 alloy to ASTM B221-2006) sealed at the top with torch applied heat-shrink rubber collar flashing, and with stainless steel or galvanized steel U-bar safety anchor (optional) if desired. Dimensions and securement to suit roof construction.



Narrow roof is being retrofitted with Pro-Bel safety railing. Vertical posts are being laid out and prepared for installation to inside of parapet wall.



The angular roof line required complete perimeter protection. This Photo shows partial installation of Pro-Bel safety railing.



Pro-Bel installers cut the horizontal rail on site to length as required.



Pro-Bel installers adjust corners and horizontal top rail to ensure guardrail is level and square before tightening up vertical posts.

SPECIFICATION

SPEC NOTE: This basic guide specification is typically written for inclusion in a miscellaneous metals specification (05500 - Metal Fabrications). Alternatively the material and fabrication clauses may be inserted into any Pro-Bel window cleaning equipment specification, i.e. 11 24 23 - Window Washing, or 14440 - Powered Platforms. Refer to appropriate Pro-Bel literature. Square brackets [] indicate choice, alternatives, data required or need for the specifier to make a decision.

PART 1 — GENERAL

- 1.01 General Requirements
- A. Comply with the conditions of the Contract and Division 1— General Requirements.
- 1.02 Section Includes
- A. Work of this section includes the design, supply and installation of safety guardrails at [roof perimeter] [localized work zone] wherever workers approach within 6'-0" (1830 mm) of an unprotected edge, without the benefit of a minimum 42" (1067 mm) high parapet or guardrail.
- 1.03 Related Sections
- A. Section [01 31 19 - Project Meetings].
B. Section [01 61 00 - Common Product Requirements].
C. Section [01 74 00 - Cleaning and Waste Management].
D. Section [03 30 00 - Cast-in-Place Concrete: concrete runway, piers and sleepers for roof cars].
E. Section [05 05 23 - Metal Fastenings: horizontal lifeline fasteners].
F. Section [05 50 00 - Metal Fabrications: monorail and davit system cantilevered support brackets].
G. Section [07 62 00 - Sheet Metal Flashing and Trim: aluminum flashing for davit bases].
H. Section [08 31 13 - Access Doors and Frames: rigging access doors in walls].
I. Section [08 44 00 - Curtain Wall and Glazed Assemblies: mullion and stabilization co-ordination].
J. Section [22 11 16 - Domestic water Piping: hot and cold water supply, faucets and drains at [every] roof level].
K. Section [26 00 00 - Electrical: climbing monorail power supply].
L. Section [26 20 00 - Low Voltage Electrical Transmission: three phase 208 volts 60 Hertz service at [every] roof level].
M. Section [26 25 00 - Enclosed Bus Assemblies: climbing monorail busbar].
N. Section [01 78 00 - Closeout Submittals].
- 1.04 References
- A. AISC 360-05 "Load and Resistance Factor Design Specification for Structural Steel Buildings".
B. ANSI/AWS D1.2/D1.2M:2003 Structural Welding Code - Steel.
- 1.05 Design Requirements
- A. Guardrails to be capable of withstanding a concentrated load of 200 lbf (0.9 kN) applied at any point in any direction.
- 1.06 Shop Drawings and Engineering Certification
- A. Submit shop drawings showing fabrication and

installation of guardrail system. Include plans, elevations, details of sections and connections, anchorages and accessory items.

- B. Where fabrications are indicated to comply with certain requirements for design loadings, include structural computations, material properties and other information needed for structural analysis.
- 1.07 Samples
- A. Submit 2 sets of representative samples of materials and finished products as may be requested by the [Architect].
- 1.08 Quality Assurance
- A. Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble guardrails only as necessary for shipping and handling. Clearly mark units for re-assembly and a co-ordinated installation.
- 1.10 Regulatory Requirements
- A. Comply with the following OSHA regulations:
1. OSHA 1910.22 (Walking - Working Surfaces).
2. OSHA 1910.66, Subpart F (Powered Platforms).
3. OSHA 1926.501, Subpart M (Safety and Health Standards for Construction).
4. CAL OSHA Title 8, Article 2, Section 3209 (Standard Guardrails).

PART 2 — PRODUCTS

- 2.01 Manufacturer
- A. This specification is generally based on systems currently being manufactured by Pro-Bel Group Ltd., Toll Free: 1-800-461-0575, Telephone: 905-427-0616, Fax: 905-427-2545, info@pro-bel.ca
- 2.02 Materials
- A. Metal surfaces: use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
B. Steel pipe (rails, posts and fittings): to ASTM A53, as required for design loading, 1-5/8" (41 mm) o.d., 1/8" (3 mm) wall thickness.
C. Wall mounting plates: to ASTM A36, 1/4" (6 mm) thickness, finished to match rail, and securement to suit.
D. Hollow steel section (HSS) piers: Type 350W, wall thickness and size to suit application.
E. Finish: manufacturer's standard [powder coat] [baked enamel] [hot dipped galvanized] [grey primer] finish.
F. Fasteners: to suit application.

SPEC NOTE: When design includes safety U-bar attachment to the base of the rail, see Pro-Bel Safety & Tie-Back Anchors literature and specifications.

- 2.03 Fabrication
- A. Fabricate work true to dimension, square, plumb, level and free from distortion or defects detrimental to performance. Adjust rail by eye for appearance.
B. Use materials of size and thickness indicated, or if not indicated, as required to produce strength and durability in finished product for use intended. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support.
C. Continuously weld seams in compliance with

AWS recommendations. Grind exposed welds smooth and flush to blend with adjoining surfaces.

- D. Form exposed connections with fine line joints, flush and smooth, using concealed fastening wherever possible. Use exposed fasteners of type indicated. If not indicated, use Phillips flat-head (countersunk) screws or bolts.
E. Provide for anchorage of type indicated co-ordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
F. At tee and cross intersections, provide coped joints.
G. Interconnect pipe at bends by means of prefabricated elbow fittings having a 90° pipe bend.
H. At elbow bends for interior and exterior corners, provide mitered joints.
I. Provide anchors for embedding units in concrete, as standard with manufacturer.

PART 3 — EXECUTION

- 3.01 Examination
- A. Examine surfaces and areas upon which the work of this Section depends. Report to the Contractor in writing, defects of work prepared by other trades and other unsatisfactory site conditions which would cause defective installation of products, or cause latent defects in workmanship and function.
B. Verify site dimensions.
C. Commencement of work will imply acceptance of prepared work.
- 3.02 Installation
- A. Install guardrails in accordance with approved shop drawings and manufacturer's recommendations.
B. Co-ordinate installation with work of related trades.
C. Install all work true, level and tightly fitted. Adjust guardrail prior to anchoring to ensure matching alignment at abutting joints. Space posts at intervals indicated, or if not indicated, as required by design loadings. Plumb posts in each direction.
D. Locate perimeter guardrail no more than 6" (150 mm) inboard of the inside face of a barrier, i.e. the parapet wall, or roof edge curb of the building being serviced. However, the perimeter location is not to exceed an 18" (457 mm) setback from the exterior building face.
- 3.03 Touch-up Painting
- A. Immediately after installation, touch up abraded areas with [matching finish] [galvanized repair paint to ASTM A 780].



Localized railings provide added protection near access hatches, doors, and/or around mechanical equipment.

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